

Abstract Submitted  
for the DNP17 Meeting of  
The American Physical Society

**Large Cleaner Detectors for the UCN $\tau$  Neutron Lifetime Experiment** FRANCISCO GONZALEZ, Indiana University, UCNTAU COLLABORATION — The UCN $\tau$  experiment at Los Alamos National Laboratory measures the neutron  $\beta$ -decay lifetime by storing ultracold neutrons (UCNs) in a magneto-gravitational trap for holding times longer than the neutron's lifetime. Neutrons with energies above the trapping potential can escape the trap, giving rise to a systematic error. To mitigate this effect, a large polyethylene sheet is lowered into the trap to remove the high energy unbound neutrons. High energy UCN upscatter in the polyethylene sheet and leave the trap. Such a "UCN spectrum cleaner," covering half the trap top, was shown to be effective in removing high-energy neutrons in previous run cycles. During this run cycle, the UCN $\tau$  collaboration has added two thermal neutron detectors on the spectrum cleaner. The new thermal neutron detectors will monitor high-energy neutrons throughout upcoming run cycles, providing important information on the neutron normalization, spectral cleaning, and heating during storage. These detectors use LiF-ZnS sheets coupled to a wavelength-shifting plastic slab, with silicon photomultipliers attached to the edges. We will present results of the light detection simulation and performance tests of these detectors.

Francisco Gonzalez  
Indiana University

Date submitted: 29 Jun 2017

Electronic form version 1.4